

Cooperative Mobile Healthcare Information Support System Using Web Services over Wireless and Wired Network

Ho Hyun Kang¹, Sung Rim Kim², Kee-Deog Kim³, Dong Keun Kim¹,
and Sun K. Yoo^{4,5,6}

¹ Graduate Program in Biomedical Engineering, Yonsei Univ.,
134 shinchon-dong, Seodaemun-Ku, Seoul, Korea

² Dept. of Internet Information, Seoil College,
49-3, Myonmok-dong, Jungang-Ku, Seoul, Korea

³ Advanced general dentistry, Yonsei University College of Dentistry

⁴ Department of Medical Engineering, College of Medicine Yonsei University

⁵ Center for Emergency Medical Informatics, Human Identification Research Center

⁶ Brain Korea 21 Project for Medical Science, correspondence,
Yonsei University College of Medicine, Seoul, Korea
sunkyoo@yumc.yonsei.ac.kr

Abstract. Mobile computing system using mobile Web Services now supports advanced methods for application integration through the Internet at distributed computing environments. Mobile Web Services on mobile networks is the foundation for ubiquitous healthcare that gives patients better medical services anytime and anywhere. However, available existing web contents are mainly used for desktops on wired networks, but are not yet compatible with mobile Web Services. In this paper, we suggested the cooperative mobile healthcare information support system. The designed system can achieve the advanced inquiring manner of medical information for collaborate diagnosis at both desktop and mobile machines, and also afford to support wider accessibility of users over wireless and wired network environments.

Keywords: Mobile Healthcare Information System, Mobile, Web Services, Cooperative design.

1 Introduction

Providing healthcare and related services through the web, or e-healthcare, is an emerging phenomenon. Wireless personal computing devices are finding a niche in the healthcare communities, promising point-of-care access to medical records and information ranging from patients to drug libraries. And they will help healthcare institutions build a real-time care process, provide a continuous patient record across the continuum of care, and improve outcomes by creating an environment where clinicians can make evidence based decisions [10].

Quickly becoming significant technology in the evolution of the Internet are Web services, a set of standards that can interconnect systems over a variety of networks. It

is an open XML-based technology providing a generic data exchange format and has been rapidly adopted by many vendors. Web services can easily be built upon existing applications, no matter what the underlying technology is. Because they are expected to have a growing familiarity and acceptance among many users and offer great technological promises, Web services are an interesting subject for the investigation of their possible application in the healthcare service platform [4].

The provision of mobile web services is an important issue in ubiquitous healthcare due to the growth of web services and wireless networks, and the increased usage of mobile devices. Mobile web services have the following attributes: interoperability of web services for desktop, internet compatibility, convenient use with small mobile devices, and mobility. Therefore, mobile web services on wireless networks are the foundation for ubiquitous healthcare that gives patients quality medical care services anytime and anywhere.

Today, healthcare services can access all of a patient's total information unified into the hospital information system. Recently many researchers have tried to integrate HIS with both wired and wireless networks. Patient satisfaction increases because of faster access to accurate healthcare information [5].

In recent years, we have seen an increasing trend in the use of small mobile devices, such as cell phone and PDAs, to access the Internet. However, these devices differ from powerful desktop computers in significantly many ways. In particular, their processor power, bandwidth and display sizes all put constraints on properly representing web content that is originally designed for desktops. To solve these problems, we need to adapt content to meet the constraints mentioned above in small mobile devices. Existing web contents are only used for desktops on wired networks but are not yet compatible with mobile web services [3, 4].

In this paper, we suggest a healthcare information system that provides healthcare information on both wired and wireless networks with the following functions. First, the system provides medical information used for desktops on wired networks. Second, the system has a mobile context server that reconfigures web contents according to the mobile device. The mobile context server applies context to the contents by using styles, a property override, and templates according to the resources of a given mobile device. In this way the system serves reconfigured web contents to the mobile device.

The rest of the paper is structured as follows: In section 2 we review several existing approaches. In section 3, we describe a healthcare web service processes. In section 4, we describe a designed system and several experiments. Finally, we conclude our paper in section 5.

2 Related Works

The mobile devices have been widely used to provide ubiquitous access to the web content. However, due to screen size limitations, it is inconvenient to browse most of the websites that are traditionally designed for desktop PCs. Therefore, developing automatic adaptation techniques to render and squeeze web content into small mobile devices become critical to Internet Service Providers.